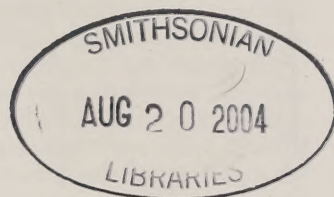


New species and records of *Soliperla* Ricker, 1952 from western North America

(Insecta, Plecoptera, Peltoperlidae)

Bill P. Stark & Dan L. Gustafson



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Soliperla cowlitz, spec. nov. and *S. salish*, spec. nov. are described from western North America and a revised key is presented for males of the genus. *Soliperla salish* represents the first species of the genus reported from the northern Rocky Mountains. New records are given for several previously known species.

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Introduction

Stark (1983) reviewed the genus *Soliperla* Ricker, 1952 and recognized five species from northern California and Nevada to the Mt. Rainier area of Washington. At that time no specimens were known from the northern Rocky Mountains, or from several potentially interesting sites in the Cascades and Olympic Peninsula. Subsequent collecting by the authors and colleagues has resulted in the discovery of two undescribed *Soliperla* species, including the first known from Idaho and Montana, and additional records of previously known species are also now available. The discovery of a new species of this genus in the northern Rocky Mountains, an area of relatively intensive collecting, may seem remarkable, but given the specialized habitat of most known *Soliperla* in seeps and splash zones of small streams it seems likely that other species await discovery.

The following acronyms are used for the various collections where specimens are deposited: B. P. Stark Collection, Mississippi College, Clinton (BPS); Monte L. Bean Museum, Brigham Young University, Provo (BYU); California Academy of Sciences, San Francisco (CAS); Cornell University, Ithaca

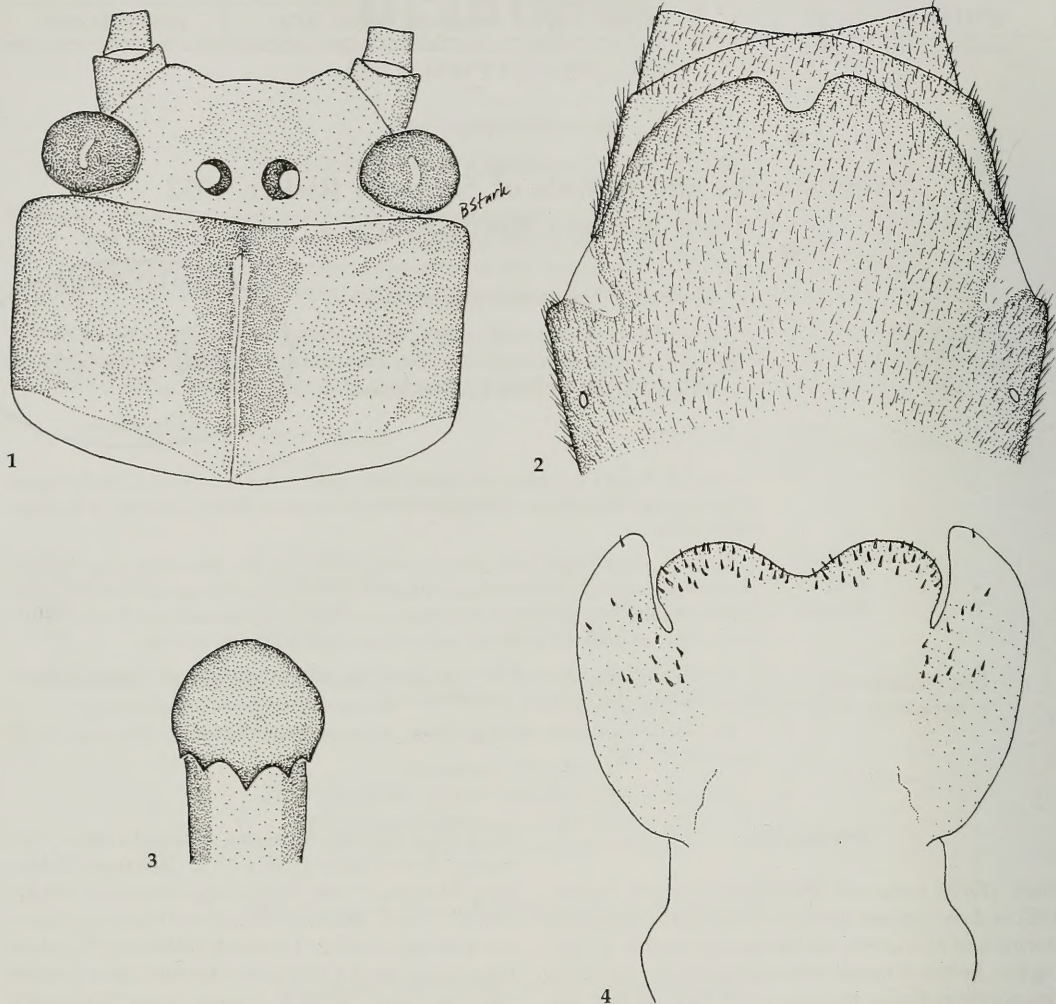
(CU); C.P. Gillette Museum, Colorado State University, Fort Collins (CSU); D.L. Gustafson Collection, Montana State University, Bozeman (DLG); Orma J. Smith Museum of Natural History, Albertson College of Idaho, Caldwell (SMNH); The Montana Entomology Collection, Montana State University, Bozeman (MTEC); Oregon State University, Corvallis (OSU); United States National Museum, Washington (USNM); Zoologische Staatssammlung, München (ZSM).

Soliperla cowlitz, spec. nov.

Figs 1-4, 11-12

Types. Holotype: ♂, Washington, Lewis Co., Slippery Rock Creek, Hwy 23, 7 June 1991, B. P. Stark, R. W. Baumann, C. Henderson (USNM). – Paratypes: 1♂, 1♀, same data (BPS); 1♂, Washington, Skamania Co., tributary East Canyon Creek, Hwy 23, 7 June 1991, B. P. Stark, R. W. Baumann, C. Henderson (BYU); 2♂♂, Skamania Co., Dog Creek, Hwy 14, Cook, 15 May 2003, B. C. Kondratieff, R. W. Baumann (CSU).

Other specimens. 1 nymph, Washington, Skamania Co., tributary East Canyon Creek, Hwy 23, 7 June 1991, B. P. Stark, R. W. Baumann, C. Henderson (BPS).



Figs 1-4. *Soliperla cowlitz*, spec. nov. structures. 1. Head and pronotum. 2. Female terminalia, ventral. 3. Epiproct, anterior aspect. 4. Aedeagus, ventral aspect.

Description

Adult habitus. Biocellate, General color yellow brown. Head yellow brown with diffuse, slightly darker spot forward of ocelli on central frons (Fig. 1). Pronotum yellow brown with scattered brown areas on disc, and brown bands on either side of median suture. Wing membrane transparent, veins brown. Legs yellow brown.

Male. Forewing length 13.0-13.5 mm. Antero-dorsal face of epiproct slightly wider than stalk (Fig. 3); three large teeth and two small lateral ones line ventral edge of anterior face; median tooth largest; stalk membranous and hairy mesally (Figs 11-12). Ventral aspect of aedeagus terminating in four membranous lobes (Fig. 4); mesal lobes broadly

rounded, separated by shallow notch and armed with scattered, sharp, short peg-like spines which continue onto dorsal surface; lateral lobes slightly longer and narrower than mesal lobes, separated from mesal lobes by deep notch and armed with a few peg-like spines; microtrichia also occur on bases of lateral lobes. Dorsal surface with terminal four lobes as on venter, and a complexly divided membranous mesal lobe; mesal lobe terminates with five short finger-like lobes.

Female. Forewing length 15 mm. Subgenital plate large, parabolic and with a shallow median notch on the apical margin (Fig. 2). Sternum 9 projects over most of sternum 10.

Egg. Undescribed.

Nymph. Pre-emergent body length 12 mm. General body color dark brown, patterned with pale dorsal spots on abdomen; terga 2 and 3 with pale lateral spots, tergum 4 with pale lateral and a small mesal spot, terga 5-7 with pale mesal spots becoming smaller on each segment. Gills and setal patterns typical of genus.

Etymology. The species name, used as a noun in apposition, honors the Native American Cowlitz people. An appropriate common name for this species, consistent with those proposed for other *Soliperla* (Stark et al. 1998), might be "Skamania Roachfly".

Diagnosis. This species will key to *S. tillamook* in Stark (1983), however in that species the four terminal aedeagal lobes are subequal in size and the lateral lobes lack peg like spines found in *S. cowlitz*. In addition, the epiproct tip for *S. cowlitz* has the mesal tooth distinctly larger than the others (Fig. 11), whereas in *S. tillamook* the two middle teeth are similar in size and larger than lateral teeth (Fig. 20). The female subgenital plate is similar to that of *S. fenderi* but in the only female available the subgenital plate notch is not triangular. Eggs taken from this teneral female did not have the usual follicle cell impressions found in other species but it is possible that these eggs were not fully developed. One of the paratypes from the Dog Creek site has the number of spines on the lateral aedeagal lobes reduced to only one or two but the epiproct appears to be identical to those of the specimens from the Mt. Adams area. Dog Creek enters the Columbia River on the Washington side, a few miles upstream of the *S. campanula* sites in the Columbia River Gorge.

Soliperla salish, spec. nov.
Figs 5-8, 9-10, 13-14

Types. Holotype: ♂, Idaho, Shoshone Co., Little North Fork Clearwater River, Campground tributary, 1300 m, 4 July 2002, D. L. Gustafson (USNM). – Paratypes: 4♂♂, same data (BPS, BYU, MTEC, and SMNH); 1♂, 1♀, Idaho, Shoshone Co., Polar Creek, 1275 m, 5 July 2003, D. L. Gustafson (BPS).

Other specimens. 1 nymph, Idaho: Clearwater Co., Gorman Creek, 1158 m, 3 July 2002, D. L. Gustafson (DLG); 1 nymph, Clearwater Co., Fern Creek near confluence with Isabella Creek, 28 July 2003, D. L. Gustafson (DLG); 9 nymphs, Shoshone Co., Little North Fork Clearwater River, Campground tributary, 1300 m, 4-5 July 2002, D. L. Gustafson (DLG, SMNH); 73 nymphs, Montana: Mineral Co., Van Ness Creek, 1151 m, 25 July 2003, D. L. Gustafson (DLG, BPS, ZSM); 31 nymphs, same site, 2 August 2003, D. L. Gustafson (DLG, MTEC).

Description

Adult habitus. Biocellate. General color yellow brown. Head yellow with diffuse spot on central frons forward of ocelli (Fig. 5). Pronotum with pale brown median band and obscure anterolateral brown spots. Wing membrane transparent, veins brown, costa and subcosta dark brown. Legs yellow brown.

Male. Forewing length 12.5-13.0 mm. Antero-dorsal surface of epiproct slightly wider than stalk at junction but sides of stalk convex and mesal section wider than face (Figs 7, 13); stalk membranous and hairy mesally; teeth set in three tiers; those in 3rd tier largest; 3rd tier with nine teeth, those in middle slightly larger than those more laterally placed (Figs 13-14). Ventral aspect of aedeagus terminating in a pair of slender, basally swollen, curved, lateral lobes and a mesal rounded lobe. Lateral lobes armed along inner margins to beyond midlength with slender setal spines in a linear patch 3-4 spines deep (Fig. 8); additional tiny microtrichia cover surface of lateral lobes.

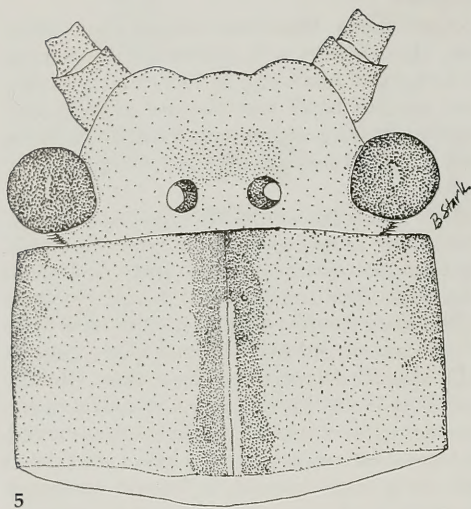
Female. Forewing length 14 mm. Subgenital plate large, parabolic with mesal emargination. Sternum 9 projects slightly over sternum 10 (Fig. 6).

Egg. Spherical, without collar. Egg completely covered with hexagonal follicle cell impressions with impunctate floors and narrow walls typical of genus (Fig. 9). Micropyles with smooth rims surrounded by FCI rosettes (Fig. 10).

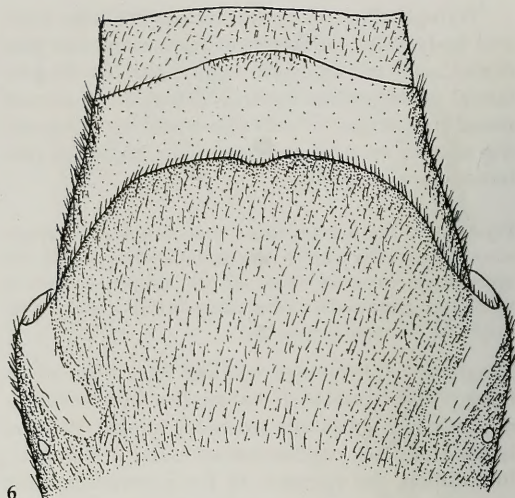
Nymph. Pre-emergent body length 11-12 mm. General color brown patterned with pale on thorax, abdomen and femora, but younger individuals are generally paler. Head mottled on occiput; pronotum mostly brown in mature nymphs but with a pair of small pale spots in groove near anterior margin, and with dark rugosities on disc; mesonotum and metanotum each usually marked with eight pale spots. Pale markings on abdominal terga variable but usually with a more or less complete pale mesal band on terga 4-6; tergum 7 often with a small pale mesal spot; anterior terga 2-4 with lateral pale areas.

Etymology. The species name, used as a noun in apposition, honors the Native American Salish people of Idaho and Montana. We suggest "Clearwater Roachfly" as a common name consistent with those proposed for other *Soliperla* (Stark et al. 1998).

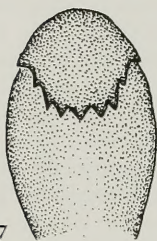
Diagnosis. Males of this species are most similar in aedeagal lobe shape and armature type to *S. fenderi*, but in that species the ventrolateral setal spines form a close set row for most of the patch length and a few spines are clustered on the apical region of the lobes. These species also differ in epiproct morphology with *S. salish* having a wide stalk that narrows



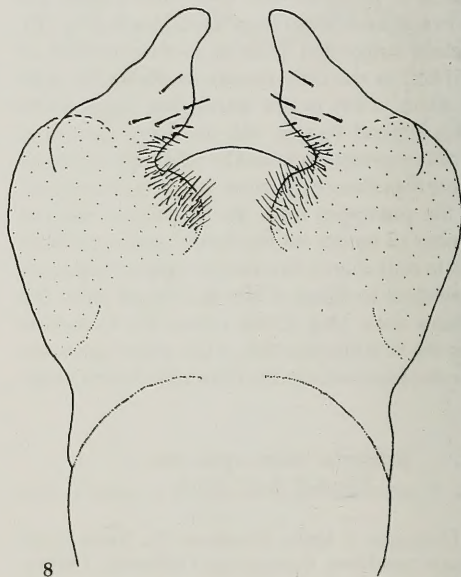
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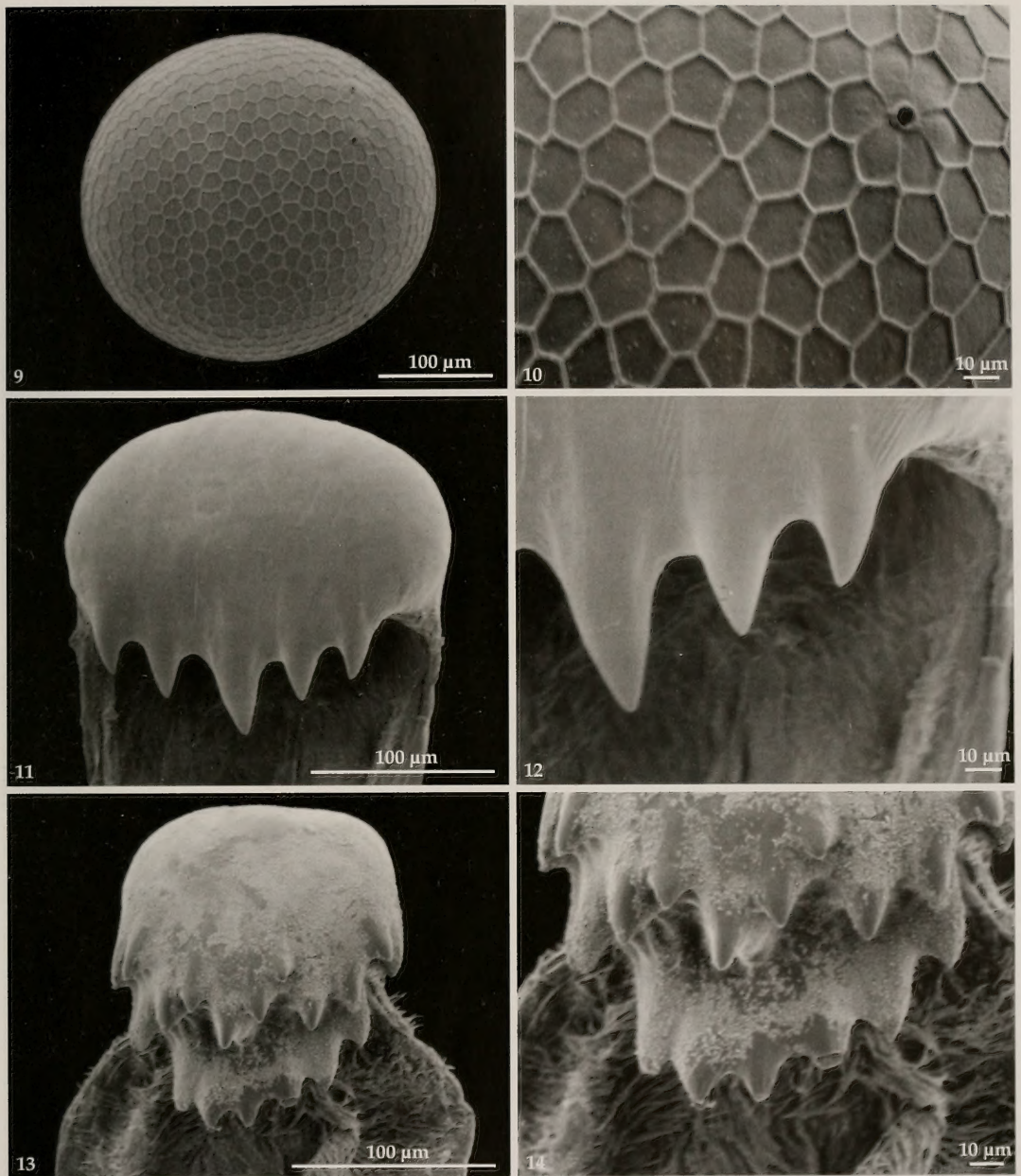
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Figs 5-8. *Soliperla salish*, spec. nov. structures. 5. Head and pronotum. 6. Female terminalia, ventral. 7. Epiproct, anterior aspect. 8. Aedeagus, ventral aspect.

near the apex (Fig. 13) and *S. fenderi* having a slender stalk throughout the epiproct length (Fig. 16). Females of the new species have a parabolic, slightly emarginate subgenital plate (Fig. 6) which distinguishes the species from *S. fenderi* and the dark brown costal region, contrasting with the paler wing venation, is unique for this species.

Biological notes. This species appears to be narrowly distributed within the headwaters of the North Fork Clearwater River in Idaho and closely adjacent

areas of the Clark Fork River in Montana. This area is a known refugium for Pacific coastal forest communities (Daubenmire 1975, Johnson & Steele 1978) and it contains many disjunct populations and endemic species including the mayflies, *Caudatella cascadia* (Allen & Edmunds) and *Caurinella idahoensis* Allen, the caddisflies, *Sericostriata surdickae* Wiggins, Weaver & Unzicker and *Eocosmoecus schmidi* (Wiggins) and the stonefly, *Soyedina potteri* (Baumann & Gauvin). All known *S. salish* sites are small, high gradient streams near their headwater sources. For-



Figs 9-14. *Soliperla* SEM micrographs. 9. *S. salish* entire egg. 10. *S. salish* chorionic detail and micropylar structure. 11. *S. cowlitz* epiproct apex. 12. *S. cowlitz* epiproct detail. 13. *S. salish* epiproct apex. 14. *S. salish* epiproct detail.

est conditions vary at these sites but western red cedar and dense deciduous brush were always present. Nymphs were found at the Van Ness Creek site on clean, vertically, or near vertically oriented cobble and boulders in areas wet from splashing or seeping water, and were absent from mossy or de-

bris covered stones in the same area. Full-grown, pre-emergent nymphs were collected together with numerous half-grown (or less) individuals at several sites suggesting more than one year is needed to complete nymphal growth. Gut contents for two half-grown nymphs from Van Ness Creek contained

finely shredded organic debris (leaves or wood) but no filamentous algae, diatoms or bryophytes.

Soliperla campanula (Jewett)

Fig. 15

Peltoperla (*Soliperla*) *campanula* Jewett, 1954: 167. Holotype ♂ (CAS), Oxbow Springs, Hood River Co., Oregon.

Soliperla campanula: Stark, 1983: 32.

Material. Oregon: 1♂, 1♀, Hood River Co., Elk Creek near Lolo Pass, 12 June 1983, G. R. Fiala (BYU); 1♂, Hood River Co., Newton Creek, Hood River Meadows, 10 July 1983, G. R. Fiala (BYU); 1♂, 1 nymph, Lane Co., Sugar Creek, FR 2618, 31 May 2000, B. P. Stark, I. Sivec, M. C. Zúñiga (BPS); 1♂, 1♀, 1 nymph, Lane Co., Wycoff Creek, FR 2618, 31 May 2000, B. P. Stark, I. Sivec, M. C. Zúñiga (BPS); 3♂♂, Lane Co., tributary Lookout Creek, FR 1506, 0.1 mile above Hwy. 15, H. J. Andrews Forest, 31 May 2000, B. P. Stark, I. Sivec, M. C. Zúñiga (ZSM); 1♂, Linn Co., Kink Creek Falls, Hwy 126 above Trail Creek Reservoir, 30 May 2000, B. P. Stark, I. Sivec, M. C. Zúñiga (BPS); 1♂, Linn Co., tributary North Santiam River, Hwy. 22, 0.2 miles N Minto Road, 3 June 2000, B. P. Stark, I. Sivec, M. C. Zúñiga (BPS); 23♂♂, 8♀♀, Multnomah Co., Wahkeena Falls, 13 May 2003, B. C. Kondratieff, R. W. Baumann (CSU, BYU); 79♂♂, 29♀♀, same location, various dates from 26 April to 20 July 1983-2000, various collectors including G. R. Fiala, R. W. Baumann, C. R. Nelson, M. Whiting, B. P. Stark (BYU, BPS, ZSM); 1♂, Multnomah Co., Lenske Creek, west of Wahkeena Falls, 15 May 2003, R. W. Baumann, B. C. Kondratieff (BYU); 4♂♂, 3♀♀, Multnomah Co., Oneonta Creek, Columbia River Gorge, 30 May 1983, G. R. Fiala, (BYU).

Remarks. Stark (1983) previously recorded this species from Lane and Linn Counties, Oregon, and Jewett (1954) and Stark (1983) included records from Hood River and Multnomah Counties, but several of the localities given above represent new sites. The Lane County sites are the southernmost records for this species, which is common around Mt. Hood and in small streams of the Columbia River Gorge. Presently no *Soliperla* records exist for Three Sisters, Mt. Jefferson and other major peaks in the central Cascades of Oregon where this species might reasonably be expected. The epiproct was examined with SEM for specimens from Wahkeena Falls, Multnomah Co., Oregon (Fig. 15). This figure shows the apex to be convex dorsoapically and concave ventroapically. The ventroapical margin has a wide toothless gap and the teeth are in three irregular tiers. The stalk is sclerotized and hairless. A female from Elk Creek, Hood River County, has a notched subgenital plate similar to that of *S. fenderi* and *S. cowlitz*, but the male collected at that site is typical *S. campanula*.

Soliperla fenderi (Jewett)

Fig. 16

Peltoperla (*Soliperla*) *fenderi* Jewett, 1955: 145. Holotype♂ (CAS), Saint Andrews Creek, Mt. Rainier National Park, Washington.

Soliperla fenderi: Stark, 1983: 34.

Material. Washington: 4♂♂, 1♀, Pierce Co., Paradise River, Paradise Valley, Mt. Rainier National Park, 16 August 1999, B. C. Kondratieff (BPS); 1♂, Pierce Co., small stream at jct. Westside Road and Hwy 706, Mt. Rainier National Park, 14 July 2003, B. C. Kondratieff, J. Schmidt (CSU); 2♂♂, Pierce Co., small stream 1.5 miles N Westside Road, Mt. Rainier National Park, 14 July 2003, B. C. Kondratieff, J. Schmidt (CSU).

Remarks. Kondratieff & Lechleitner (2002) gave additional records of 20 specimens taken at seven sites in Mt. Rainier National Park. The species is presently known only from the Park and might be more common than present collections indicate. SEM study of the epiproct (Fig. 16) shows the apex is about as wide as the stalk and bears two well developed rows of teeth and 1-2 additional teeth between the rows; the ventroapical marginal row usually includes six fairly prominent teeth, and the upper row has 3-4 smaller teeth. The epiproct stalk is sclerotized laterally, membranous and hairy in a wide mesal strip.

Soliperla quadrispinula (Jewett)

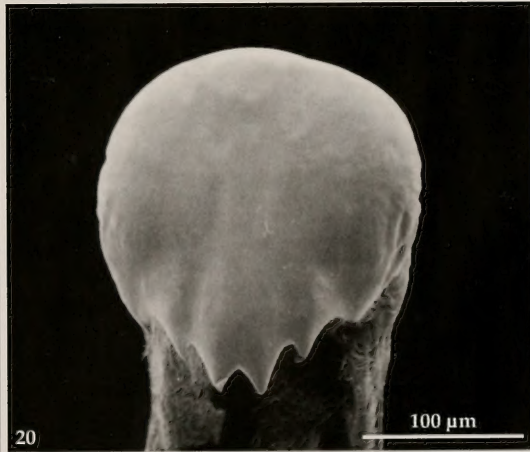
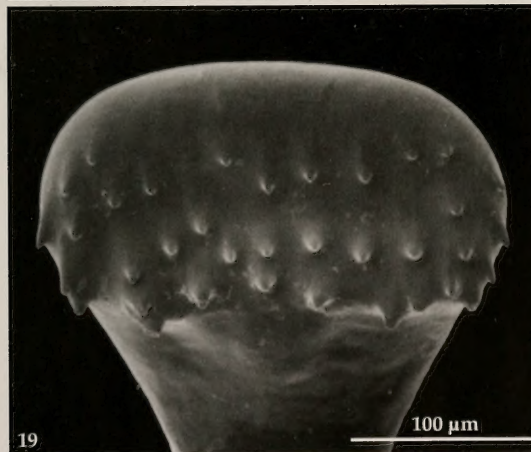
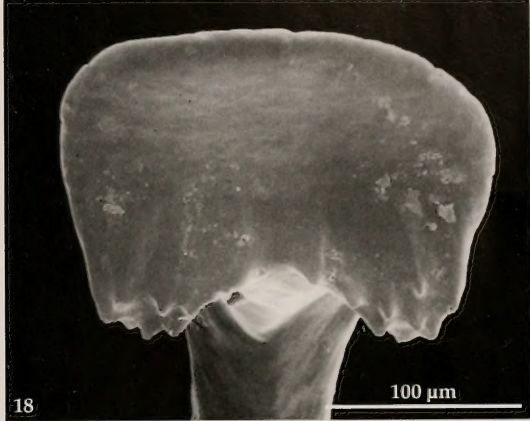
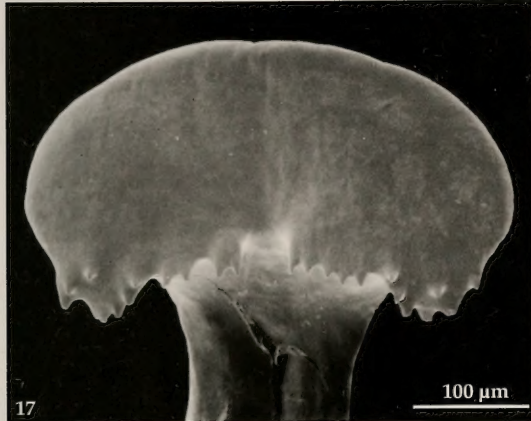
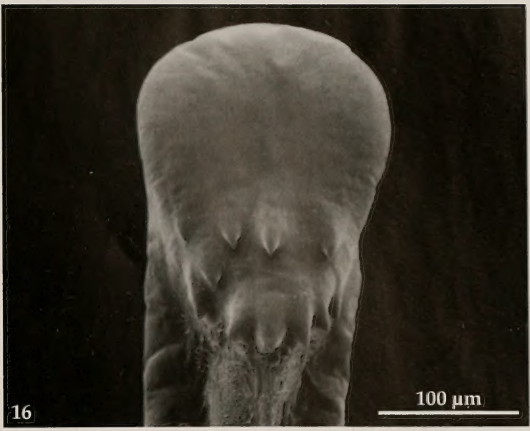
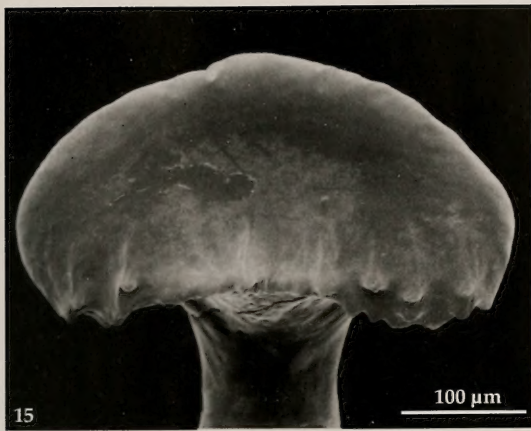
Fig. 17

Peltoperla (*Soliperla*) *quadrispinula* Jewett, 1954: 169. Holotype ♂ (CAS), Wrangle Gap Camp, Jackson Co., Oregon.

Soliperla quadrispinula: Stark, 1983: 36.

Material. California: 1♂, Del Norte Co., 3 miles NE Hiouchi, 1 June 1991, B. P. Stark, R. W. Baumann, C. Henderson (BPS); 1♂, Humboldt Co., Cedar Creek, Hwy 299, 31 May 1991, B. P. Stark, R. W. Baumann, C. Henderson (BPS); 1♂, Humboldt Co., Ruby Creek, Hwy 299, 3.8 miles E Berry Summit, 540 m, 19 May 1998, C. R. Nelson, B. P. Stark, I. Sivec, S. W. Szczytko (BYU). Oregon: 2♂♂, Benton Co., Yew Creek, Marys Peak Road, 1 June 2000, B. P. Stark, I. Sivec, M. C. Zúñiga (ZSM); 1♂, Benton Co., springs along Marys Creek Road, 28 June 1985, D. E. Ruitter (CSU); 1♂, Curry Co., seeps 1 mile below Fish Hatchery, Elk River Canyon, 3 June 1991, B. P. Stark, R. W. Baumann, C. Henderson (BPS).

Remarks. These records are within the reported range of this species but several represent new counties or sites. *Soliperla quadrispinula* is present in small streams of the Coast Range from northern California to Clatsop Co., Oregon. Presently no records are available from north of the Columbia River along



Figs 15-20. *Soliperla* SEM micrographs of epiprocts. 15. *S. campanula* (Jewett). 16. *S. fenderi* (Jewett). 17. *S. quadrispinula* (Jewett). 18. *S. sierra* Stark. 19. *S. thyra* (Neeham & Smith). 20. *S. tillamook* Stark.

the coast of Washington. SEM shows considerable variation in armature of the anterodorsal epiproct face, but most specimens have a relatively high number of irregularly sized teeth, often set in mul-

tiple tiers on the lateral margins; the major tier typically has a narrow mesal gap (Fig. 17). The epiproct stalk is smooth and hairless.

Soliperla sierra Stark

Fig. 18

Soliperla sierra Stark, 1983: 36. Holotype ♂ (USNM). French Creek, Butt Reservoir Road, Plumas Co., California.

Material. 1♀, California: Sierra Co., Big Springs, Hwy 49, 2 miles W Bassetts, 29 May 1991, B. P. Stark, R. W. Baumann, C. Henderson (BPS); 4♂♂, same site, 27 June 2003, P. A. Opler (CSU).

Remarks. The specimens listed above are the only known collections of this species since the original description, and the "Big Springs" site is the same one listed in Stark (1983). The epiproct from one of the paratype specimens was examined with SEM (Fig. 18). This figure shows the apex to be almost quadrangular but with a large mesal notch on the ventral margin; teeth are in three irregular tiers and there is a conspicuous mesal toothless gap. The epiproct stalk is sclerotized and hairless.

Soliperla thyra (Needham & Smith)

Fig. 19

Peltoperla thyra Needham & Smith, 1916: 87. Holotype ♂ (CU). Nevada.

Soliperla thyra: Stark, 1983: 38.

Material. California: 1♂, 1♀, El Dorado Co., Skunk Canyon Creek, Mosquito Ridge Road, 7 miles E Foresthill, 16 May 1983, R. W. Baumann, Mower (BYU); 4♂♂, 6♀♀, El Dorado Co., Mad Canyon Creek, Mosquito Ridge Road, 5 miles E Foresthill, 16 May 1983, R. W. Baumann, Mower (BYU); 3♂♂, El Dorado Co., Bridal Veil Falls, Hwy 50 above picnic area, 14 May 1983, R. W. Baumann, Mower (BYU); 9♂♂, 1♀, Glenn Co., Salt Creek near Alder Springs, 27 April 1987, B. P. Stark, R. W. Baumann, C. R. Nelson (ZSM); 1♂, Marin Co., Bill Williams Creek, Kentfield, 14 May 1983, R. F. Gill (BYU); 1♂, Sierra Co., Mossey Falls, Hwy 49 near jct Indian Creek, 18 May 1983, R. W. Baumann, Mower (BYU).

Remarks. Most of these specimens represent new county records from the east slope of the Coast Ranges or west slope of the Sierras. Previous records given by Stark (1983) extend from Santa Clara County to Mendocino County in the Coast Ranges and the holotype is from an unspecified locality in Nevada. Presently the Mendocino-Humboldt County area appears to be the intersection of ranges for *S. quadrispinula* and *S. thyra*, and Sierra County appears to be the intersection of ranges for *S. sierra* and *S. thyra*, however no overlap is known for these species. SEM study of the epiproct of the Glenn

County specimens (Fig. 19) shows teeth are scattered over the anterodorsal surface in three or four very irregular but fairly complete rows; most teeth are uniform in size but a few larger ones occur laterally and midlaterally on the ventral tier; a wide mesal gap occurs in the ventral tier, but this is almost filled with a series of teeth offset from the row. The stalk becomes gradually wider near the head and is subequal in width to the head at their junction; ventral surface of stalk sclerotized and hairless.

Soliperla tillamook Stark

Fig. 20

Soliperla tillamook Stark, 1983: 41. Holotype ♂ (OSU), Osweg Creek, Clatsop Co., Oregon.

Material. Oregon: 2♂♂, Clatsop Co., seeps on Nehalem River, 4 miles SW Spruce Run, 6 June 1991, B. P. Stark, R. W. Baumann, C. Henderson (BPS); 1♂, 1♀, Clatsop Co., Quartz Creek, Hwy. 26, 20 June 1986, G. R. Fiala (BYU); 6♂♂, Tillamook Co., tributary Neskowin Creek, Slab Creek Road, 4 June 1991, B. P. Stark, R. W. Baumann, C. Henderson (BPS); 2♂♂, Tillamook Co., falls on Hwy 6, Tillamook State Forest, 5 June 1991, B. P. Stark, R. W. Baumann, C. Henderson (ZSM); 18♂♂, Tillamook Co., seeps on Nehalem River below Roy Creek, Foss Road, 6 June 1991, B. P. Stark, R. W. Baumann, C. Henderson (BPS, BYU); 4♂♂, Tillamook Co., seep 21 miles W Gales Creek, 30 June 1985, G. R. Fiala (BYU); 4♂♂, 2♀♀, Tillamook Co., seep at mile post 31 on Wilson River, Hwy 6, 30 June 1985, G. R. Fiala (BYU); 5♂♂, Tillamook Co., seep on Nehalem River near Nehalem Falls, Tillamook State Forest, 6 May 1991, R. W. Baumann, B. P. Stark (BYU); 1♂, Tillamook Co., falls at mile post 29, Hwy 6, 10 July 1997, S. Fitzgerald, A. Foley (CSU).

Remarks. Previously, this species was known from three males and a single female collected at two sites in Clatsop County, Oregon (Stark 1983). With the additional material it was possible to evert the aedeagus for several males in the field permitting a more complete description of the male genitalia. In ventral aspect the aedeagus terminates in four subequal membranous lobes; inner lobes slightly wider than lateral lobes and armed with slender, transparent, sharp peg-like spines on apex and continuing on dorsum; microtrichia cover lateral lobes. The anterodorsal face of the epiproct is about as wide as the stalk and typically bears six ventral teeth with mesal teeth larger than laterals (Fig. 20). The epiproct stalk is densely hairy and membranous mesally.

Key to *Soliperla* males
(Modified from Stark 1983)

1. Anteromesal surface of epiproct stalk membranous and covered with pale hair 2.
- Anterior surface of epiproct stalk sclerotized and hairless 5.
2. Epiproct apex armed with 2-3 irregular rows of teeth (Fig. 16); ventrolateral aedeagal lobes with patches of long setal spines along inner margins (Fig. 8); aedeagal apex without paired mesal lobes 3.
- Epiproct apex armed with a single well defined row of teeth (Fig. 11); ventrolateral aedeagal lobes without long setal spines (Fig. 4); aedeagal apex with a pair of mesal lobes subequal in size to lateral lobes 4.
3. Epiproct stalk at midlength distinctly wider than epiproct apex (Figs. 7, 13); ventrolateral aedeagal lobes armed along inner basal margins with a patch of setal spines 3-4 deep and without scattered spines on apex (Fig. 8); lobes curved strongly inward at apex; known from Idaho and Montana *S. salish*, spec. nov.
- Epiproct stalk uniformly wide and subequal to apex (Fig. 16); ventrolateral aedeagal lobes armed along inner basal margins with a single close set row of setal spines and a few scattered setal spines on apex; lobes not curved strongly inward at apex; known from Mt. Rainier National Park *S. fenderi* (Jewett)
4. Mesal epiproct tooth distinctly longer than others (Fig. 11); ventrolateral aedeagal lobes slightly longer than inner lobes; inner lobes separated by shallow emargination; inner and lateral lobes armed with scattered, sharp, peg-like spines (Fig. 4) *S. cowlitz*, spec. nov.
- Mesal pair of epiproct teeth subequal in size and larger than others (Fig. 20); ventrolateral aedeagal lobes subequal to inner lobes; inner lobes separated by a distinct V-shaped notch; lateral lobes without sharp, peg-like spines
..... *S. tillamook* Stark
5. Epiproct stalk becomes gradually wider nearer apex (Fig. 19); epiproct apex subequal in width to stalk at junction; ventral aedeagal lobes with a prominent sclerotized bilobed process
..... *S. thyra* (Needham & Smith)

- Epiproct apex about twice as wide as stalk at junction (Fig. 15); ventral aedeagal lobes largely membranous, without a bilobed sclerite 6.
- 6. Apical aedeagal lobes armed with 1-2 long thick setal spines *S. quadrispinula* (Jewett)
- Mesoventral area of aedeagus with two irregular, longitudinal rows of peg-like spines 7.
- 7. Lateral aedeagal lobes terminating in a sclerotized spine with 2-4 subapical peg-like spines; known from Plumas and Sierra counties, California *S. sierra* Stark
- Lateral aedeagal lobes membranous apically with 2-4 subapical peg-like spines; known from the Cascades of Central and Northern Oregon
..... *S. campanula* (Jewett)

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